



X-Plain™

Radiation Therapy for Prostate Cancer

Reference Summary

Cancer of the prostate is the most common form of cancer that affects men. About 240,000 American men are diagnosed with prostate cancer every year.

Your doctor may have recommended radiation therapy for your prostate cancer. This reference summary reviews the benefits and risks of radiation therapy.

Cancer And Its Causes

The body is made up of very small cells. Normal cells in the body grow and die in a controlled way. Sometimes cells keep dividing and growing without normal controls, causing an abnormal growth called a tumor.

If the tumor does not invade nearby tissues and body parts, it is called a benign tumor, or non-cancerous growth. Benign tumors are rarely life threatening.

If the tumor invades and destroys nearby cells, it is called a malignant tumor, or cancer. It may threaten a person's life.

Cancerous cells may spread to different parts of the body through blood vessels and lymph channels. Lymph is a nearly clear fluid produced by the body that drains waste from cells. It travels through special vessels and bean-shaped structures called lymph nodes.

Cancer treatments are used to kill or control abnormally growing, cancerous cells. Cancers in the body are given names depending on where the cancer originates. For example, cancer that begins in the lungs will always be called a lung cancer, even if it has spread to another place such as the liver, bones, or brain.

Although doctors can locate where a cancer begins, the cause of a cancer in a patient cannot usually be identified. Cells contain hereditary, or genetic, materials called chromosomes. This genetic material controls the growth of the cell. Cancer always arises from changes that occur in these genetic materials. When the genetic material in a cell

becomes abnormal, it can lose its ability to control its growth.

These sudden changes in genetic material can occur for a variety of reasons. This tendency may be inherited from parents. Changes in genetic materials may also occur because of exposure to infections, drugs, tobacco, chemicals, or other factors.

Anatomy

The prostate is one of the male sex glands. It is located just below the bladder, the organ that collects and empties urine. It is also located in front of the rectum, the lower part of the intestine, where solid wastes are stored.

The prostate is about the size of a walnut. It surrounds the urethra, the tube that carries urine from the bladder to the outside of the body. The prostate makes fluid that makes up most of the semen, the white fluid in which sperm travel.

The prostate is affected by male sex hormones. Hormones are substances that control functions of the body. The

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most important male hormone is testosterone, which is produced by the testicles.

Prostate Cancer - Diagnosis

Often, early cancer of the prostate has no symptoms. To examine the prostate your doctor will insert a gloved finger into the rectum to feel for lumps in the prostate. This is called digital rectal examination. Sometimes the tumor may be too small for the doctor to feel during a rectal examination.

As the cancer grows, it squeezes the urethra. Urine passes through the urethra when a man empties his bladder. This is why one of the first symptoms of prostate cancer is usually difficulty urinating. Note, however, that other diseases can also cause difficulty in urination.

The speed at which cancer grows varies from person to person. The earlier the prostate cancer is detected, the better are the chances of successful treatment. That is why doctors recommend a blood test called a PSA test to help find prostate cancer during its early stages.

PSA, or Prostatic Specific Antigen, is a substance in the blood that may indicate prostate cancer. If the amount of PSA in the blood is higher than normal

or if the doctor feels a lump during a rectal examination, the doctor will consider further prostate cancer testing.

Some tests help the doctor see the prostate and other parts of the body where the cancer may spread. Examples of such tests are:

- Ultrasound
- X-ray
- IVP
- Bone scan
- MRI.

Your doctor may take cells from your prostate and look at them under the microscope. Your doctor will usually do this by putting a needle into the prostate to remove some cells. This is called fine needle biopsy.

Once cancer of the prostate has been diagnosed, more tests will be done to find out if cancer cells have spread from the prostate to tissues surrounding it or to other parts of the body. This is called staging. To plan treatment, your doctor needs to know the stage of the cancer.

Staging

If the patient has cancer, it is important to determine:

- How much the cancer has grown.
- And if it has spread to other parts of the body.

These two pieces of information help your doctor determine the stage of a cancer. Knowing the stage of the cancer helps the doctor determine the best treatment options.

A pathologist carefully analyzes cells and tissue taken from the prostate cancer. A pathologist is a doctor who examines a sample of your cancer under the microscope.

Doctors group prostate cancer into four stages. The higher the stage, the more advanced the cancer is.

Stage 1 or A

Prostate cancer at this stage cannot be felt and causes no symptoms. The cancer is only in the prostate and is usually found accidentally when surgery is done for other reasons. It is too small to be felt during a rectal examination.

Stage 2 or B

The tumor is still located within the prostate but is large enough to be felt during rectal examination. There are often no symptoms.

Stage 3 or C

Cancer cells have spread outside the prostate to surrounding tissues. Difficulty in urinating is common.

Stage 4 or D

Cancer cells have spread to lymph nodes near or far from the prostate or to organs and tissues far away from the

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prostate, such as a bone, the liver, or lungs. The patient may experience difficulty urinating, bone pain, weight loss, and tiredness.

Treatment Options

Treatment of prostate cancer depends on the stage of the cancer, as well as the patient's age and his overall health.

Your doctor may follow your condition more closely rather than start treatment immediately. This decision depends on whether:

- You have symptoms
- Are elderly
- Have another illness that is more serious
- Have only slightly abnormal tumor cells.

New advances in medical technology and knowledge make it possible to treat all patients who have cancer of the prostate.

Thousands of men with prostate cancer are living longer with less discomfort and fewer treatment side effects. Four kinds of treatment are commonly used.

1. Surgery.
2. Radiation therapy using high doses, x-rays, or other high-energy rays to kill cancer cells.

3. Hormonal therapy using hormones to stop cancer cells from growing.
4. A combination of radiation and hormonal therapy.

Surgery can be used to remove cancer from the prostate and from nearby tissues into which the cancer has spread. Surgery is generally recommended during the early stages of the cancer. If prostate cancer is found in its early stages, surgery may cure the disease.

Several surgical options are available to remove prostate cancer. One procedure involves removing the prostate through the perineum, the area between the scrotum and the anus. This procedure is called radical perineal prostatectomy. The entire prostate and nearby cancerous tissue are removed. Another radical prostatectomy procedure for removing the prostate cancer and nearby lymph nodes is done through an incision through the lower abdomen. This procedure is called radical retropubic prostatectomy.

Radical prostatectomy is done only if the cancer has NOT spread outside the prostate. Often before this is done, your doctor will do surgery to take out lymph nodes in the pelvis to see if they contain cancer. This

is called a pelvic lymph node dissection.

If the lymph nodes contain cancer, your doctor may not do a prostatectomy and may or may not recommend other therapy at this time.

Another procedure, called transurethral resection of the prostate or TURP, involves removing benign tissue from the prostate by inserting an instrument through the urethra into the penis. Only part of the prostate is removed.

This operation is sometimes done before other treatment to relieve symptoms caused by the tumor. It is also done for men who cannot have radical prostatectomy due to age or other illnesses.

Another procedure, called cryosurgery, involves killing the cancer by freezing.

Radiation therapy is the use of high-energy radiation to kill cancer cells and shrink tumors. Because the rays cannot be directed perfectly, they may damage both cancerous and healthy cells nearby. If the dose of radiation is small and spread over time, the cancer cells die while the healthy cells are able to recover and survive.

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Hormonal therapy is the use of hormones to stop cancer cells from growing. Male hormones, like testosterone, can help prostate cancer grow.

To stop the cancer from growing, the patient is given medication to decrease the amount of male hormones.

Examples of such medications are:

- Female hormone therapy
- LHRH therapy
- Antiandrogen therapy.

Sometimes an operation to remove the testicles, called an orchiectomy, is done to stop the testicles from making testosterone, the main male hormone.

Hormone therapy is usually used during advanced stages of cancer when the cancer has spread outside the prostate or to other parts of the body.

Hormone therapy does not cure cancer but can slow its growth, helping extend life and relieve symptoms.

Chemotherapy is the use of toxic drugs to kill cancer cells. Chemotherapy may be taken by pill or may be injected into the body by a needle into a vein or muscle. With chemotherapy, the drug enters the blood stream, travels through the body, and kills rapidly growing cells, which includes cancer cells and healthy cells. To

destroy cancer cells without seriously harming healthy ones, the drugs are given in certain dosages over time.

To date, chemotherapy does not work well in many men with prostate cancer. When it is used, chemotherapy is limited to certain advanced stages of prostate cancer in which the cancer has spread to other parts of the body.

After treatment, prostate cancer may come back, or recur. The treatment option for recurrent prostate cancer depends on several factors such as:

- The stage of the cancer
- What treatment the patient had before
- The health of the patient.

External Beam Radiation

Radiation therapy is the use of high-energy radiation to kill cancer cells and shrink tumors. Radiation may come from a machine outside the body; this is called external radiation therapy. It may also be given by putting materials that produce radiation in the area where the cancer cells are found; this is called internal radiation therapy or brachytherapy. Your doctor has recommended external radiation therapy.

A machine is used to aim high-energy x-rays at the cancer tissue. The machine changes positions so that the beams can enter from different angles. Because the rays cannot be directed perfectly, they may damage both cancer and healthy cells nearby.

If the dose of radiation is small and spread over time, the cancer cells die while the healthy cells are able to recover and survive. Radiation therapy usually is given for prostate cancer that has not spread to other parts of the body, such as lungs and bones.

Treatment Course

Before beginning radiation therapy, your radiation therapy team will plan the treatment first. During the planning visit, a process called simulation will be conducted. During simulation, the target area will be outlined and defined. The surface of the skin, where the beam will enter the body, will be marked.

The reference marks are made of ink. They are placed on your skin and lined up with laser lights to position you accurately for treatment. The red laser light is not harmful and is used for positioning.

Next, CAT scans will be obtained for computerized

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treatment planning to determine the most appropriate way to deliver radiation therapy. This advanced technology allows your doctor to deliver the appropriate radiation dose at the right locations. This, in turn, limits radiation of normal tissue and reduces early and late side effects.

During radiation therapy, the patient or the treatment area must be immobilized so that each radiation treatment targets the same area. This also makes it possible to reproduce the radiation in the next therapy sessions. Your doctor may use a body cast to immobilize you in the treatment position.

In addition, custom-made blocks are made to protect normal areas. The CAT scans used for planning radiation are performed on a flat tabletop similar to the radiation treatment table. The patient is placed in the treatment position specific for him.

The simulator is a machine that helps your doctor plan the radiation treatments. The simulator helps the doctor plan where to deliver the radiation. Your radiation oncologist and the healthcare team will review the results of the computerized treatment planning and determine the most suitable treatment method.

Radiation therapy is usually not started during the planning visit. Radiation therapy will be delivered daily, Monday through Friday, for approximately 7 to 8 weeks for a curative course.

Each visit takes about 20 to 30 minutes. You will meet with your doctor on a regular basis to discuss your progress.

In the radiation therapy room, you may be asked to change into a hospital gown. The therapist will then position you on the treatment table. The therapist will leave the room and start the radiation treatments.

You should lie still and breathe naturally. You will hear mechanical sounds coming from the machine. When a treatment ends, the therapist will help you off the table.

After you have completed all planned radiation treatments, your radiation oncologist will monitor your progress by scheduling follow-up visits.

External Beam Radiation – Risks & Side Effects

The side effects of external beam radiation can include either early or late side effects. Early side effects are usually temporary and start occurring

from the fourth week on. Late side effects may occur up to six months or one to two years after you have completed radiotherapy.

The early side effects of external radiation treatment to the prostate are related to changes that happen in the normal tissues surrounding the prostate during radiation therapy. These organs are the rectum, colon, bowel, urinary bladder, and skin.

There could be some itchiness or discomfort in the perineal skin. This is the area between the scrotum and the anus. This could be treated with specific ointments or creams and instructions on how to keep the perineal area dry and clean.

There could be some darkening of the skin in the anal area. Radiation may affect the lining of the rectum and bowels, causing some abdominal discomfort, diarrhea, and excessive gas and cramping. These can be treated with diarrhea and gas medications.

Radiation may affect the lining of the urinary bladder, increasing frequency of urination and causing a burning sensation during urination. On some occasions when the prostate is quite large, it might cause urinary retention. These

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signs can be treated with urinary bladder medication.

Radiation therapy may cause a loss of pubic hair. Hair usually grows back after treatment.

Radiation therapy may also cause some fatigue, which is best treated with rest and relaxation.

Scarring causes the late side effects. Scarring might appear in the area where the radiation was given. Most patients usually tolerate this quite well.

However, in a small number of patients, scarring might produce changes in the lining of the rectum, colon, or urinary bladder, and narrowing of the inside of the bowel. This may cause diarrhea, bleeding from the rectum, blood in the urine, and increased frequency of urination.

Scarring around the nerves in the radiation area might cause erectile dysfunction, or impotence. Surgery may be recommended to repair scarring and narrowing of the bowels.

After Radiation Therapy

You will be able to drive yourself home after each radiation treatment.

Do not remove the marks on your skin until your doctor or

radiation therapist tells you. You can shower but do not scrub the marked area. If your skin is dry and itching, apply the lotion or ointment recommended by your doctor and wear loose clothing. Most itching will heal in 2 to 3 weeks after the last radiation treatment.

If you experience a loss of appetite, eat several small meals of food that you like every day. Make sure your diet includes lots of protein, such as meat and beans, so your body can repair healthy cells.

If you feel tired, rest and relax more frequently. You should stop feeling fatigue a few weeks after your last treatment session.

Sometimes the mouth and throat become dry. Drink water during the day to avoid dryness or to feel better if it happens.

Most prostate patients undergoing radiation therapy do not change their regular activities. Ask your doctor if you can keep working and continue your regular activities during radiation treatments.

Summary

Recent advances in medical technology make it possible to use high-energy x-rays to kill and limit the growth of prostate cancer. External beam radiation

is a safe procedure with significant success in limiting the growth of cancer in early stages or reducing pain in later stages.

External radiation has early, temporary side effects and potential long-term side effects. Learning about them will help you detect them early and treat them if they happen.

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